#44/Appeal Brief 11/6/03 K Daniel

Docket No. 0756-2028

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:	)	Group Art Unit: 2673
Ichiro TAKAYAMA et al.	)	Examiner: R. Osorio
Serial No. 09/394,345	)	CERTIFICATE OF MAILING
Filed: September 13, 1999	)	I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as First Class Mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on: 10.21.2003.
For: ACTIVE MATRIX TYPE FLAT-PANEL DISPLAY DEVICE	)	Adele M Stamper

APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In accordance with the provisions of 35 U.S.C. § 134 and 37 C.F.R. § 1.192(a), Appellants submit this Appeal Brief in triplicate to appeal the examiner's final rejection of claims 11-32 in the Official Action mailed March 19, 2003.

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I. REAL PARTY IN INTEREST

The named inventors have assigned all ownership rights in the pending application to Semiconductor Energy Laboratory Co., Ltd., 398, Hase, Atsugi-shi, Kanagawa-ken, 243-0036, Japan, and TDK Corporation, 13-1, Nihonbashi, 1-chome, Chuo-ku, Tokyo, 272-0026, Japan, which are the real parties in interest.

II. RELATED APPEALS AND INTERFERENCES

The appellants, their legal representatives, and the assignee are not aware of any other pending appeals or interferences which will directly affect or be directly affected by, or have a bearing on the Board's decision in this appeal.

III. STATUS OF THE CLAIMS

Claims 11-44 are pending in the present application, of which claims 33-44 are withdrawn. Accordingly, claims 11-32 are elected, of which claims 11, 14, 17, 21 and 24 are independent. No claims have been deemed allowable by the examiner.

IV. STATUS OF AMENDMENTS

A *Supplemental Amendment* is submitted herewith in response to the Final Official Action mailed March 19, 2003. The *Supplemental Amendment* corrects minor typographical errors in the claims. It is not believed that the *Supplemental Amendment* raises any new issues that would require further consideration or search and thus is believed to be appropriate for entry after final. All prior amendments are believed to have been entered in the present application. Thus, the status of the claims in this application is as set forth above and in Appendix A.

V. SUMMARY OF THE INVENTION

The present invention relates to a display device (*e.g.* display device 10 in Figure 1,) comprising a substrate (*e.g.* page 5, line 23), a plurality of light emissive elements (*e.g.* EL element EL_{11}) arranged in a matrix form over the substrate (*e.g.* page 5, line 24 – page 6, line 1, Figure 2), where each of the light emissive elements comprises an organic electroluminescent material (*e.g.* page 6, lines 1-3), a plurality of first thin film transistors

formed over the substrate (*e.g.* line-selecting TFT T_{y11}), a plurality of second thin film transistors formed over the substrate and connected to the plurality of light emissive elements, respectively, where one of the first thin film transistors is connected to a gate of one of the second thin film transistors (*e.g.* drive TFT M_{11}), and a circuit for driving the first thin film transistors, the circuit comprising third thin film transistors formed over the substrate (*e.g.* column-selecting TFT T_{x1}).

The present invention also relates to an active matrix type organic luminescent display device comprising a substrate, at least one first signal line (*e.g.* the line associated with selection signal y_1) and one second signal line (*e.g.* the line associated with selection signal x_1) formed over the substrate, the at least one first signal line and one second signal line intersecting each other over the substrate, a first thin film transistor formed over the substrate, where the first signal line is connected to a gate of the first thin film transistor and the second signal line is connected to a source or drain of the first thin film transistor, a second thin film transistor formed over the substrate where the first thin film transistor is connected to a gate of the second thin film transistor, an organic electroluminescent element formed over the substrate, a power supply line (*e.g.* EL power supply) electrically connected to the second thin film transistor, and a circuit for driving the first thin film transistor, the circuit comprising third thin film transistors formed over the substrate. The present inventors have found that the above-referenced structure of the present invention greatly improves picture quality by preventing overlap between selection signals of neighboring columns or lines (page 3).

VI. STATEMENT OF ISSUES

Whether claims 11-32 are not *prima facie* obvious based on the combination of U.S. Patent No. 4,042,854 to Luo et al., U.S. Patent No. 5,670,792 to Utsugi et al., and U.S. Patent No. 3,885,196 to Fischer.

VII. GROUPING OF CLAIMS

The rejected claims shall stand or fall together.

VIII. ARGUMENTS

Whether claims 11-32 are not *prima facie* obvious based on the combination of U.S. Patent No. 4,042,854 to Luo et al., U.S. Patent No. 5,670,792 to Utsugi et al., and U.S. Patent No. 3,885,196 to Fischer.

To establish a *prima facie* case of obviousness, (1) there must be some suggestion or motivation (either in the references themselves or in the knowledge generally available to one of ordinary skill in the art) to combine the reference teachings; (2) there must be a reasonable expectation of success; and (3) the prior art references when combined must teach or suggest all the claim limitations. See *MPEP* § 2142-43. Once a *prima facie* case of obviousness has been made by the Patent Office, the burden then shifts to the Applicants to rebut that *prima facie* case. This rebuttal can include any arguments or presentation of evidence that is pertinent to the issue of unobviousness including, for example, that the prior art is so deficient that there is no motivation to make what might appear to be obvious changes. See *In re Dillon*, 16 U.S.P.Q.2d 1897, 1901 (Fed. Cir. 1990); *MPEP* § 2142. For the reasons that follow, it is respectfully submitted that a *prima facie* case of obviousness cannot be maintained in this application.

The Official Action rejects claims 11-32 as obvious based on the combination of U.S. Patent 4,042,854 to Lou et al., U.S. Patent 5,670,792 to Utsugi et al., and U.S. Patent 3,885,196 to Fischer. The Applicants respectfully submit that the Official Action has failed to establish a *prima facie* case of obviousness in that the prior art of record, whether taken alone or in combination, fails to teach each and every limitation of the present invention. Furthermore, it is respectfully submitted that the Official Action fails to provide a sufficient showing that one of skill in the art would have been motivated to combine the references to achieve the present invention.

As noted in MPEP § 2142, the initial burden is on the examiner to provide some suggestion of the desirability of doing what the inventor has done. "To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). It is respectfully

submitted that Luo, Utsugi and Fischer fail to expressly or impliedly suggest an organic electroluminescent element formed over a substrate, a first thin film transistor formed over the substrate, a second thin film transistor formed over the substrate and connected to an organic electroluminescent element, where the first thin film transistor is connected to a gate of the second thin film transistor, and a circuit for driving the first thin film transistor, the circuit comprising a third thin film transistor formed over the substrate. Also, it is further submitted that the examiner has not presented a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.

Luo appears to teach a thin film switching transistor T1 and a power transistor T2 connected to an electroluminescent phosphor layer 38, as shown in Figures 2-4. Utsugi appears to teach use of an organic EL element. Fischer appears to teach reducing the "size restriction of electroluminescent display panels" by forming a bank of column shift register MOSs Q10-Q18, a bank of row shift register MOSs Q28-Q40, and display MOSs Q41-Q56 on one side of a substrate, and connecting these elements via feedthrough holes 57 to electroluminescent elements 58 on the other side of the substrate. As is noted in greater detail below, the reduction of size is due to the location of elements on opposite sides of the substrate and has nothing to do with the formation of a bank of column shift register MOSs Q10-Q18, a bank of row shift register MOSs Q28-Q40, and display MOSs Q41-Q56.

The Official Action concedes that the alleged combined device of Luo and Utsugi "fails to teach of a circuit for driving said first TFTs comprising third TFTs which are column-selecting transistors" (page 2, Paper No. 38). The Official Action relies on Fischer to allegedly teach this feature of the present invention. The Applicants respectfully disagree. Fischer fails to disclose or suggest a driving circuit including third thin film transistors formed over the claimed substrate. The Official Action asserts that elements Q10-Q18 and/or Q20-Q26 correspond to the claimed third thin film transistors and asserts that such transistors are formed over the same substrate as the first TFTs, citing Figures 1 and 2; column 1, lines 18-32; and column 3, lines 31-55. The Applicants respectfully assert that Fischer is at best silent about the relationship

between the elements Q10-Q18 and Q20-Q26, and the substrate. Specifically, column 1, lines 18-32 recite:

> The present invention alleviates the size restriction of electroluminescent display panels by disclosing a single crystalline substrate that has metallic oxide semiconductors, or thin film transistors, positioned on one side and light emitting diodes positioned on the opposite side and in direct registry with metallic semiconductors (MOS) or the thin film transistor (TFT) circuitry. . . . This invention is a direct current electroluminescent display panel on which a solid layer of electroluminescent material for individual light emitting diodes (LEDs) are addressed by MOSs or TFTs.

Also, column 3, lines 31-55 recite:

> The voltage pulses from generators 20 and 21 are (handed off) in bucket brigade fashion by column and row bucket brigade shift registers. The column bucket brigade shift registers is comprised of horizontal clocks A and B, represented by numerals 6 and 8 and generator 20, along with a bank of column shift register MOSs Q10, Q12, Q14, Q16, and Q18. The row bucket brigade shift register is comprised of vertical clock 22 and generator 21, along with a bank of row shift register MOSs Q28, Q30, Q32, Q34, Q36, Q38, and Q40. Horizontal clocks 6 and 8 produce square waves 6a and 8a, respectively, which are 180° out of phase with each other. Waves 6a and 8a (hand off) in a bucket brigade manner the horizontal synchronizing pulses from circuit 20 along column shift register MOSs Q10, Q12, Q14, Q16, Q18, and others (not shown) to form the total horizontal portion of a display. The horizontal synchronizing pulses from generator 20 are passed through the column shift register MOSs and are applied to the gate electrode of video MOSs Q20, Q22, Q24, Q26, and others (not shown) totaling the number of columns in the matrix of display elements. Terminal 28 is connected to the source terminals of the video MOSs. Video signals that are applied to terminal 28 are therefore also applied to all the source terminals of the video MOSs.

It is respectfully submitted that nowhere in this portion of Fischer is there any discussion of the relationship between the elements Q10-Q18 and Q20-Q26, and the substrate. In this regard, while the Official Action asserts that one would be motivated to combine the teachings of Fischer with Lou and Utsugi to alleviate the size restriction of EL panels as discussed in column 1, lines 18-25, the subsequent portion of column 1 makes clear that the invention in Fischer has nothing to do with elements Q10-Q18 and

Q20-Q26, but rather with the registration between the MOSs and LEDs. Column 1, lines 32-47 continues:

> Using the MOSs and LEDs in the preferred embodiment, these MOSs and LEDs are in exact registration with each other and on opposite sides of the panel. The panel is prepared by depositing silicon on a substrate made of some insulator material, such as a spinel or sapphire single crystal wafer. Holes are drilled through the substrate by electron or laser beams or by using photoetching techniques. One hole is provided for each related MOS and LED. Conductive material is deposited in the holes to connect the electrical outputs from the MOSs to the inputs of the LEDs. The MOSs are scanned by horizontal and vertical bucket brigade shift registers. Either layer of electroluminescent Group II-VI materials or the LEDs are deposited on the front side of the substrate after the addressing MOSs are deposited on the back side of the substrate.

Therefore, the asserted motivation to include the elements Q10-Q18 and Q20-Q26 of Fischer in the combined device of Lou and Utsugi (namely to alleviate "the size restriction of EL panels" as discussed in column 1, lines 18-25) is improper since one of skill in the art would not look to elements Q10-Q18 and Q20-Q26 to achieve this advantage, but rather would look to forming the MOS and LED elements in directed registration as disclosed in Fischer.

The alleged motivation to combine, *i.e.* reducing the size of the EL panel, is contrary and completely unrelated to the proposed change to Luo, *i.e.* adding a third thin film transistor. Specifically, it is unclear why one of ordinary skill in the art at the time of the invention would reduce the size of an EL panel by adding components, namely a plurality of third thin film transistors.

Furthermore, the prior art does not teach or suggest all the claim limitations, the third prong required to establish a *prima facie* case of obviousness as discussed above. Fischer, Lou and Utsugi fail to disclose or suggest that the elements Q10-Q18 and/or Q20-Q26, asserted to correspond to the claimed third thin film transistors, are formed over the same substrate as the first TFTs. As noted above, the relationship between elements Q10-Q26 and the substrate is silent in Fischer. Accordingly, even if Luo, Utsugi and Fischer could be combined, it is respectfully submitted that the combination would not teach or suggest all of the limitations recited in the pending claims.

The Official Action further asserts that "integrating or separating the TFTs to the substrate depends on the choice of the manufacturer" and that "to integrate all the TFTs in the same substrate will avoid the use of unnecessary wiring, save energy, and minimize signal dissipation" (pages 2-4, Paper No. 38). The Applicants respectfully disagree. The Official Action does not provide any support from the prior art for this assertion. The Applicants respectfully submit that nothing in the prior art of record or within the knowledge or skill of an ordinary artisan at the time of the invention would teach or suggest the desirability of an organic electroluminescent element formed over a substrate, a first thin film transistor formed over the substrate, a second thin film transistor formed over the substrate and connected to an organic electroluminescent element, where the first thin film transistor is connected to a gate of the second thin film transistor, and a circuit for driving the first thin film transistor, the circuit comprising a third thin film transistor formed over the substrate. Specifically, Fischer does not teach or suggest why one would be motivated to add either column shift register MOSs Q10-Q18 or row shift register MOSs Q20-Q26 to the Luo device, much less how one would successfully add them to the Luo device even if motivated to do so.

It is respectfully submitted that there has been an insufficient showing that one of skill in the art would have been motivated to combine the teachings of Fischer, Lou and Utsugi to achieve the present invention and that a *prima facie* case of obviousness cannot be maintained.

Also, it should be noted that the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680 (Fed. Cir. 1990). In other words, simply because the references can be combined does not mean that they should be combined. Thus, simply because one could combine and modify the teachings of Luo, Utsugi and Fischer, does not mean one of skill in the art would do so absent some suggestion of the desirability of doing so.

For all of the above reasons, it is respectfully asserted that the pending claims of the present application are unobvious in view of the prior art of record. Reversal of the outstanding rejections of record and allowance of the claims of this application is requested.

The present application is believed to be in condition for allowance and favorable reconsideration is respectfully requested. If the Examiner feels further discussions would expedite prosecution of this application, he is invited to contact the undersigned.

Respectfully submitted,

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IX. APPENDICES

A. Claims involved in the appeal.

B. U.S. Patent No. 4,042,854 to Luo et al.

C. U.S. Patent No. 5,670,792 to Utsugi et al.

D. U.S. Patent No. 3,885,196 to Fischer.

APPENDIX A

PENDING CLAIMS

1.-10. (Canceled)

11. (Previously Presented) A display device comprising:

a substrate;

a plurality of light emissive elements arranged in a matrix form over said substrate;

a plurality of first thin film transistors formed over said substrate;

a plurality of second thin film transistors formed over said substrate and connected to said plurality of light emissive elements, respectively, wherein one of said first thin film transistors is connected to a gate of one of said second thin film transistors; and

a circuit for driving said first thin film transistors, said circuit comprising third thin film transistors formed over said substrate,

wherein each of said light emissive elements comprises an organic electroluminescent material.

12. (Previously Presented) The display device according to claim 11 further comprising a first shift register and a second shift register, electrically connected to said plurality of first thin film transistors.

13. (Previously Presented) The display device according to claim 11 further comprising a power supply line connected to said second thin film transistors.

14. (Previously Presented) An active matrix type organic luminescent display device comprising:

a substrate;

at least one first signal line and one second signal line formed over said substrate, said at least one first signal line and one second signal line intersecting each other over said substrate;

a first thin film transistor formed over said substrate, wherein said first signal line is connected to a gate of said first thin film transistor and said second signal line is connected to a source or drain of the first thin film transistor;

a second thin film transistor formed over said substrate wherein the other one of the source or drain of the first thin film transistor is connected to a gate of the second thin film transistor;

an organic electroluminescent element formed over said substrate and electrically connected to a source or drain of said second thin film transistor;

a power supply line electrically connected to the other one of the source or drain of the second thin film transistor; and

a circuit for driving said first thin film transistor, said circuit comprising third thin film transistors formed over said substrate.

15. (Previously Presented) The display device according to claim 14 wherein a video signal is applied to the gate of the second thin film transistor through said second signal line and said first thin film transistor.

16. (Previously Presented) The display device according to claim 14 wherein said power supply line extends in parallel with said second signal line.

17. (Previously Presented) An active matrix type organic luminescent display device comprising:

a substrate;

at least one first signal line and one second signal line formed over said substrate, said at least one first signal line and one second signal line intersecting each other over said substrate;

a first thin film transistor formed over said substrate, wherein said first signal line is connected to a gate of said first thin film transistor and said second signal line is connected to a source or drain of the first thin film transistor;

a second thin film transistor formed over said substrate, wherein the other one of the source or drain of the first thin film transistor is connected to a gate of the second thin film transistor;

an organic electroluminescent element formed over said substrate and electrically connected to a source or drain of said second thin film transistor;

a power supply line electrically connected to the other one of the source or drain of the second thin film transistor;

a capacitor formed between the gate of the second thin film transistor and the source or drain of the second thin film transistor to which said power supply line is connected; and

a circuit for driving said first thin film transistor, said circuit comprising third thin film transistors formed over said substrate.

18. (Previously Presented) The display device according to claim 17 wherein a video signal is applied to the gate of the second thin film transistor through said second signal line and said first thin film transistor.

19. (Previously Presented) The display device according to claim 17 wherein said power supply line extends in parallel with said second signal line.

20. (Previously Presented) The display device according to claim 17 further comprising a first shift register and a second shift register, electrically connected to said plurality of first thin film transistors.

21. (Previously Presented) An active matrix type organic luminescent display device comprising:

a substrate;

at least one first signal line and one second signal line formed over said substrate, said at least one first signal line and one second signal line intersecting each other over said substrate;

a first thin film transistor formed over said substrate, wherein said first signal line is connected to a gate of said first thin film transistor and said second signal line is connected to a source or drain of the first thin film transistor;

a second thin film transistor formed over said substrate, wherein the a gate of said second thin film transistor is electrically connected to said second signal line through said first thin film transistor;

an organic electroluminescent element formed over said substrate;

a power supply line electrically connected to said organic electroluminescent element through said second thin film transistor; and

a circuit for driving said first thin film transistors, said circuit comprising third thin film transistors formed over said substrate.

22. (Previously Presented) The display device according to claim 21, wherein a video signal is applied to the gate of the second thin film transistor through said second signal line and said first thin film transistor.

23. (Previously Presented) The display device according to claim 21 wherein said power supply line extends in parallel with said second signal line.

24. (Previously Presented) An active matrix type organic luminescent display device comprising:

a substrate;

at least one first signal line and one second signal line formed over said substrate, said at least one first signal line and one second signal line intersecting each other over said substrate;

a first thin film transistor formed over said substrate, wherein said first signal line is connected to a gate of said first thin film transistor;

a second thin film transistor formed over said substrate, wherein a gate of said second thin film transistor is electrically connected to said second signal line through said first thin film transistor;

an organic electroluminescent element formed over said substrate;

a power supply line formed over said substrate and electrically connected to said organic electroluminescent element through said second thin film transistor;

a capacitor formed between the gate of the second thin film transistor and said power supply line; and

a circuit for driving said first thin film transistors, said circuit comprising third thin film transistors formed over said substrate.

25. (Previously Presented) The display device according to claim 24 wherein a video signal is applied to the gate of the second thin film transistor through said second signal line and said first thin film transistor.

26. (Previously Presented) The display device according to claim 24 wherein said power supply line extends in parallel with said second signal line.

27. (Previously Presented) The display device according to claim 24 further comprising a first shift register and a second shift register, electrically connected to said plurality of first thin film transistors.

28. (Previously Presented) The display device according to claim 11 wherein said third thin film transistors are column-selecting transistors.

29. (Previously Presented) The display device according to claim 14 wherein said third thin film transistors are column-selecting transistors.

30. (Previously Presented) The display device according to claim 17 wherein said third thin film transistors are column-selecting transistors.

31. (Previously Presented) The display device according to claim 21 wherein said third thin film transistors are column-selecting transistors.

32. (Previously Presented) The display device according to claim 24 wherein said third thin film transistors are column-selecting transistors.

33. (Withdrawn) An active matrix type display device comprising:

a plurality of first signal lines extending in parallel over a substrate;

a plurality of second signal lines extending across the plurality of first signal lines to define a plurality of picture elements arranged in a matrix form over the substrate;

at least one drive thin film transistor provided in each of the plurality of picture elements;

a plurality of selecting thin film transistors connected to the plurality of first signal lines, respectively;

a plurality of logic circuits to output selection signals to the plurality of selecting thin film transistors, respectively;

a shift register connected to a first terminal of each of the plurality of logic circuits; and

a mask signal generation circuit to output a mask signal to a second terminal of the plurality of logic circuits.

34. (Withdrawn) The active matrix type display device according to claim 33 wherein said display device is an EL display.

35. (Withdrawn) The active matrix type display device according to claim 33 wherein said display device is an organic EL display.

36. (Withdrawn) The active matrix type display device according to claim 33 wherein said display device is an inorganic EL display.

37. (Withdrawn) The active matrix type display device according to claim 33 wherein said display device is a liquid crystal device.

38. (Withdrawn) The active matrix type display device according to claim 33 further comprising field emission diodes in the picture elements.

39. (Withdrawn) An active matrix type display device comprising:

a plurality of first signal lines extending in parallel over a substrate;

a plurality of second signal lines extending across the plurality of first signal lines to define a plurality of picture elements arranged in a matrix form over the substrate;

at least one first thin film transistor provided in each of the plurality of picture elements wherein a gate of the first thin film transistor is connected to a corresponding one of the second signal lines;

at least one second thin film transistor provided in each of the plurality of picture elements wherein a gate of the second thin film transistor is electrically connected to one terminal of the first thin film transistor;

a plurality of selecting thin film transistors connected to the plurality of first signal lines, respectively;

a plurality of logic circuits to output selection signals to the plurality of selecting thin film transistors, respectively;

a shift register connected to a first terminal of each of the plurality of logic circuits; and

a mask signal generation circuit to output a mask signal to a second terminal of the plurality of logic display.

40. (Withdrawn) The active matrix type display device according to claim 39 wherein said display device is an EL display.

41. (Withdrawn) The active matrix type display device according to claim 39 wherein said display device is an organic EL display.

42. (Withdrawn) The active matrix type display device according to claim 39 wherein said display device is an inorganic EL display.

43. (Withdrawn) The active matrix type display device according to claim 39 wherein said display device is a liquid crystal device.

44. (Withdrawn) The active matrix type display device according to claim 39 further comprising field emission diodes in the picture elements.